



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/550,796

09/22/2005

Hideki Mori

SON-2943

4006

23353 7590 10/20/2008  
RADER FISHMAN & GRAUER PLLC  
LION BUILDING  
1233 20TH STREET N.W., SUITE 501  
WASHINGTON, DC 20036

EXAMINER

MATTHEWS, COLLEEN ANN

ART UNIT

PAPER NUMBER

2811

MAIL DATE

DELIVERY MODE

10/20/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/550,796	<b>Applicant(s)</b> MORI ET AL.	
	<b>Examiner</b> Colleen A. Matthews	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 17 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/22/2005</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Species of Fig 1A-1B in the reply filed on 02/25/2008 is acknowledged.

Applicant's remarks regarding the restriction requirement mailed 05/29/2008 have been considered and are found persuasive. The restriction requirement mailed 05/29/2008 is withdrawn. Accordingly claims 1-16 are examined below.

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "interconnection portion" as in claim 3 and the "interconnect layer" as in claim 4, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

Art Unit: 2811

of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

#### **Claims 6 and 13 are rejected under 35 U.S.C. 112, second paragraph, as**

being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claim 6 and claim 13** recite the limitation "the distance (L1)" in line 2. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claim 15 is rejected under 35 U.S.C. 102(b)** as being anticipated by U.S. Pat. No. 5,708,291 to Bohr et al. (Bohr).

**Re claim 15:** semiconductor device comprising a fuse (100) including a conductive material (105) in a multilayer structure on a semiconductor substrate (107), said fuse having a fuse body (122) and two pads (120) connected by the fuse body, characterized in that the width of the fuse body is smaller than the width of each of the two pads and the length (118) of the fuse body is 1.8 to 20  $\mu\text{m}$  (Fig 1B, length of fuse body is 118, col 4 lines 1-5 describes length 118 as four to twenty-five times width of 117 which is 0.22  $\mu\text{m}$ , so length 118 ranges from 0.88 to 5.5  $\mu\text{m}$  which overlaps the claimed range.

**Claims 1, 3-4, 6, 8, 11-13 are rejected under 35 U.S.C. 102(a)** as being anticipated by Applicant's Admitted Prior Art (AAPA) of Figures 10A-10B.

**Re claim 1:** AAPA discloses a semiconductor device comprising:  
a fuse (102) having a fuse body (102A) and two pads (102Ba, 102Bb) connected by the fuse body and two conductive layers (104A, 104B) individually connected to two pads, the above being formed inside a multilayer structure on a semiconductor substrate (100),

characterized in that a length (D0) of the fuse body (120A) is defined so that the melting location (102Ab) of the fuse becomes positioned in the fuse body away from a region overlapped on the conductive layers (Fig 10A shows melting portion 102Ab within fuse body 102A & Fig 10B shows that fuse body 102A is not covered by

Art Unit: 2811

conductive layers 104A, 104B) when an electrical stress is applied between the two conductive layers to melt the fuse.

**Re claim 8:** AAPA discloses a semiconductor device comprising a fuse (102) having a fuse body (102A) and two pads (102Ba, 102Bb) connected by the fuse body and two conductive layers (104A, 104B) individually connected to two pads, the above being formed inside a multilayer structure on a semiconductor substrate (100),

characterized in that a width of portions of conductive layers (104A, 104B) including contact regions (103A, 103B) with the pads (102Ba, 102Bb) is defined in at least one of the above two conductive layers so that the melting location (102Ab) of the fuse (102) becomes positioned in the fuse body (102A) away from a region overlapped on the conductive layers when an electrical stress is applied between the two conductive layers to melt the fuse (Fig 10A shows melting portion 102Ab within fuse body 102A & Fig 10B shows that fuse body 102A is not covered by conductive layers 104A, 104B).

**Re claims 3 and 11:** AAPA discloses a semiconductor device characterized in that at least one of the two conductive layers (104A, 104B) has a portion of a predetermined width connected to a corresponding pad (102Ba, 102Bb) and an interconnect portion (portion within opening 103A, 103B) having a width narrower than the portion of the predetermined width.

**Re claims 4 and 12:** AAPA discloses a semiconductor device characterized in that an interconnect layer (portion within opening 103A, 103B) having a width narrower

Art Unit: 2811

than that of the conductive layers (104A, 104B) is connected to at least one of the above two conductive layers.

**Re claims 6 and 13:** AAPA discloses a semiconductor device as set forth in claim 1, characterized in that a distance (distance from left end of 104A to right end of 104b) between the above two conductive layers (104A, 104B) is larger than the distance between above two pads (102Ba, 102Bb) of the fuse (102).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 2, 5, 7 9-10, 14 and 16 are rejected under 35 U.S.C. 103(a)** as being unpatentable over Applicant's Admitted Prior Art (AAPA) of Figures 10A-10B in view of U.S. Pat. No. 5,708,291 to Bohr et al. (Bohr).

**Re claims 2 and 10:** AAPA discloses a semiconductor device characterized in that: the width of the fuse body (120A) is smaller than the width of each of the two pads (120Ba, 120Bb). AAPA fails to disclose and the length of the fuse body is 1.8 to 20  $\mu\text{m}$ . Bohr discloses the length of the fuse body is 1.8 to 20  $\mu\text{m}$  (Fig 1B, length of fuse body is 118, col 4 lines 1-5 describes length 118 as four to twenty-five times width of 117 which is 0.22  $\mu\text{m}$ , so length 118 ranges from 0.88 to 5.5  $\mu\text{m}$  which overlaps the claimed range). It would have been obvious to one of ordinary skill in the art at the time the

Art Unit: 2811

invention was made to modify AAPA to have the length of the fuse body as in Bohr in order to accommodate difference processing technologies, space considerations and other fuse requirements.

**Re claims 5 and 9:** AAPA discloses a semiconductor device characterized in claims 1 and 8. AAPA fails to disclose the width of the portions of the conductive layers including the contact regions with the pads is 6 to 14  $\mu\text{m}$ . Bohr discloses the width of a fuse 117 as 0.22  $\mu\text{m}$  and that the width can vary (col 3 lines 63-67 & col 4 line 1). Bohr does not explicitly disclose the width of the portion of the conductive layers including the contact regions (120), however based on the scale of the drawings and the discussion that the dimensions can vary, optimizing the width of the conductive layers would not be cause for undue experimentation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA to have the width of the portions of the conductive layers including the contact regions with the pads is 6 to 14  $\mu\text{m}$  in order to accommodate difference processing technologies, space considerations and other fuse requirements.

**Re claims 7 and 14:** AAPA discloses a semiconductor device characterized in claims 1 and 8. AAPA fails to disclose a distance from the contact regions (103A, 1035B) connecting the conductive layers (104A, 104B) and the pads (102Ba, 102Bb) to edges of the pad contacting the fuse body (3A) is 0.25 to 0.90  $\mu\text{m}$ . Bohr discloses the length of the fuse body is 0.88 to 5.5  $\mu\text{m}$  (Fig 1B, length of fuse body is 118, col 4 lines 1-5 describes length 118 as four to twenty-five times width of 117 which is 0.22  $\mu\text{m}$ , so length 118 ranges from 0.88 to 5.5  $\mu\text{m}$ ). Bohr does not explicitly disclose the distance



Art Unit: 2811

from the contact regions, however based on the scale of the drawings and the discussion that the dimensions can vary, optimizing the distance from the contact regions would not be cause for undue experimentation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA to have the distance from the contact regions 0.25 to 0.90  $\mu\text{m}$  in order to accommodate difference processing technologies, space considerations and other fuse requirements.

**Re claim 16:** AAPA discloses semiconductor device comprising a fuse (F1) including a conductive material (102) in a multilayer structure on a semiconductor substrate (100), said fuse (F1) having a fuse body (102A) and two pads (102Ba, 102Bb) connected by the fuse body (102A), conductive layers (104A, 104B) connected one by one to said two pads. APA fails to disclose the width of the portions of the conductive layers including the contact regions with the pads is 6 to 14  $\mu\text{m}$ . Bohr discloses the width of a fuse 117 as 0.22  $\mu\text{m}$  and that the width can vary (col 3 lines 63-67 & col 4 line 1). Bohr does not explicitly disclose the width of the portion of the conductive layers including the contact regions (120), however based on the scale of the drawings and the discussion that the dimensions can vary, optimizing the width of the conductive layers would not be cause for undue experimentation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA to have the width of the portions of the conductive layers including the contact regions with the pads is 6 to 14  $\mu\text{m}$  in order to accommodate difference processing technologies, space considerations and other fuse requirements.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen A. Matthews whose telephone number is (571)272-1667. The examiner can normally be reached on Monday - Friday 8AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. A. M./  
Examiner, Art Unit 2811

/Lynne A. Gurley/  
Supervisory Patent Examiner, Art  
Unit 2811